AgriCos e-Newsletter

Vol. 2, Issue No. 5, May 2021
©agricos e-newsletter
ISSN:2582-7049
Article No: 01

Special Section on Land Degradation

Is Asia's Largest Grassland Degrading due to *Prosopis Juliflora* Invasion?

Anandkumar Naorem

Banni grassland is the finest grasslands in India which span over 2600 sq.km. in arid Gujarat. It is a home to a pastoral community called "*Maldharis*" and known for its rich wildlife and biodiversity. However, the introduction of an invasive species *Prosopis juliflora* has overtaken the native grasses of Banni (Fig.1). It is locally called as "*Ganda Babul*" meaning "crazy Babul" as it does not allow any other plants to grow in its vicinity.

Fig. 1. Leaves of *Prosopis juliflora* (Source: author)

Scientist (Soil Science),
Presently Head (I/C),
Indian Council of Agricultural Research-Central Arid Zone Research Institute, RRS-Bhuj, 370105-Gujarat
Anandkumar.naorem@icar.gov.in

The increasing desertification in arid Gujarat has been a cause of concern for decades. *P. juliflora* is one of the proximate drivers of desertification in Banni and has invaded more than half the Banni grassland soils. The survival and proliferation of *P. juliflora* in this unique ecosystem invites certain theories related to its soil and environmental factors. Is the salinity ingression in Banni related to the invasion of this species? Is the unique Banni soils best for *P. juliflora*? What are the soil related-underlying mechanisms of this strong survival rate of *P. juliflora*? All these questions are yet to be answered because there are limited scientific evidences in this regard. Physiologically, *P. juliflora* produces a significant amount of specific allelochemicals such as *mesquitol*. But, why are these allelochemicals produced? Is it related to the increasing aridity of Kutch, Gujarat? What is the legacy effects of this plant after uprooting or are there any challenges in its removal? In a nutshell, there are larger number of questions than the answers we have received till now. Therefore, this topic is well chosen to succinctly discuss the importance of studying the possible effects of *P. juliflora* on soil properties and associated environmental changes. This article will form a strong base for future researchers to work on this aspect and save the Banni from degradation in the coming years of climate change.

To cite this article: Naorem, A.K. (2021). Is Asia's largest grassland degrading due to Prosopis juliflora invasion?, AgriCos E-Newsletter 2(05), 1-3

The Banni is Asia's largest grassland, located in Kachchh district of Gujarat, India that spreads across 2617 sq.km. Banni is inhabited by a group of pastorial community called "Maldharis", meaning those who rear "maal" or cattle. These maldharis depend on Banni grassland for their livelihood and is ascribed to livestock based earning. Owing to several anthropogenic activities and climate change, land degradation has been the biggest threat to this vast grassland. Out of these activities that led to the desertification of the complex ecosystem is the invasion of a plant species "*Prosopis juliflora*". Vast area of this unique grassland is being invaded by *P. juliflora*. When it comes to the history of this invasion, it dates back to 1961 during India's 13th Independence Day celebration that has significantly changed the ecology of Banni grassland. The northern border of Banni grassland is predominated by Rann of Kutch, known for its vast salt marsh. In order to protect the salinity ingress from Rann of Kutch, seeds of *P. juliflora* was spread over 21,500 hectares through helicopters. This invasive tress species is locally known as "Gonda Babul" meaning "Crazy Babool", due to its fast growth and high stress tolerance. *P. juliflora* is a bushy but a thorny tree that grows quickly and propagates easily. There has been documentations reporting the extraction of groundwater by *P. juliflora* that leaves meagre amount of soil moisture for other neighboring plants. *P. juliflora* invaded the Banni grassland in the cost of replacing the native local grasses which are highly palatable for cattle.

In addition to these issues, *P. juliflora* is known to secrete allelochemicals that limits and restricts the growth of other plants. These allelochemicals are released from fruit, leaves and roots of the plant. The water soluble allelochemicals reach the soil surface and acts a growth limiting chemical for other plants. Some examples of allelochemicals released by *P. juliflora* are juliprosine, julifloricine, juliprosopine, julifloridine etc. This has resulted to shift of the fodder resources in Banni.

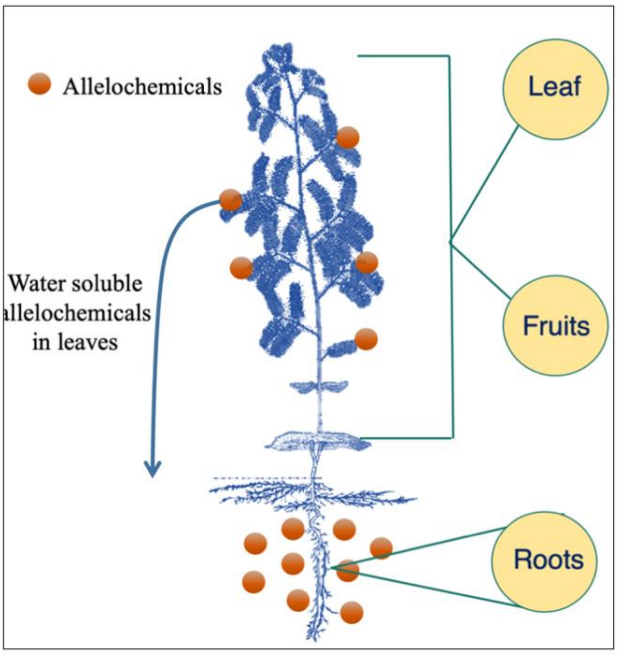

Fig. 2. Allelochemicals releasing from different plant parts of *P. juliflora* (Source:author)

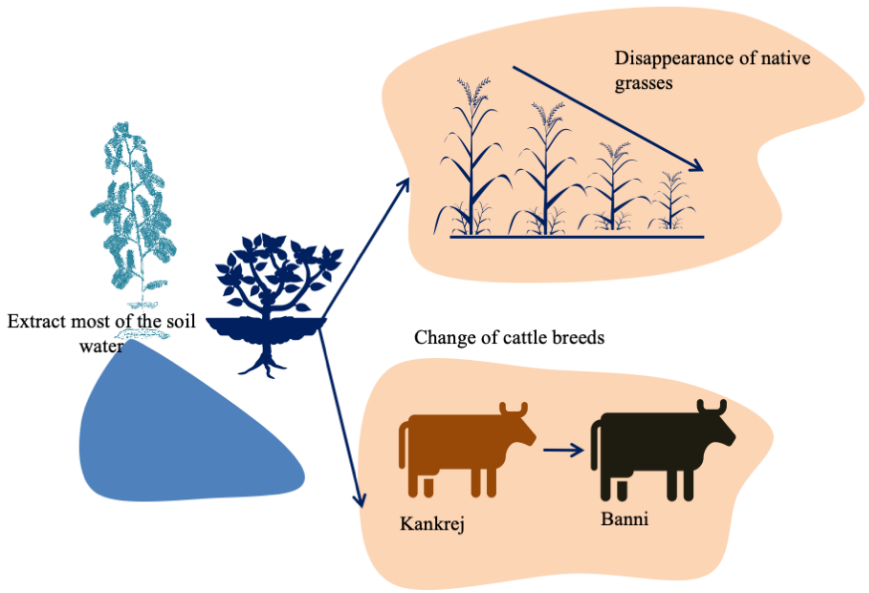

Fig. 3. Impact of feeding *P. juliflora* to cattle (Source:author)

The local Kankrej breed of cows were slowly disappearing and being replaced with Banni buffaloes. The white revolution has brought tremendous progress in the country while the recommendation of planting *P. juliflora* under green revolution had significantly disturbed the milk production of the grassland. The cows when fed with *P. juliflora* leaves could not digest it and could cause a lot of harm to it.

The seeds from the pods could not be digested and therefore pass through animal faeces. This resulted in transfer of *P. juliflora* seeds from one place to another and aggravated the problem. The exotic species has covered most of Banni grassland and has increased the salinity problem in the region. Despite of the serious issue, relatively less scientific research have been conducted and documented in Banni grassland. Further and urgent studies must be carried out to understand the complexities of this vast grassland and take urgent actions to conserve the Banni grassland and to protect the lost of its unique ecosystem to an invasive plant species.

To cite this article: Naorem, A.K. (2021). Is Asia's largest grassland degrading due to Prosopis juliflora invasion?, AgriCos E-Newsletter 2(05), 1-3